

What is claimed is:

1. A method of loop detection and dissolution in a communication network including a plurality of nodes, each of the plurality of nodes being directly linked through ports to at least one neighbor node and indirectly linked through a neighbor node to at least one remote node, the method comprising:

(a) detecting a change in topology of the network by at least one of the plurality of nodes;

(b) sending a vote token from the detecting node to each neighbor node, said vote token including an address of the detecting node and number of neighbor nodes of the detecting node;

(c) receiving the vote token from the sending node at each of the neighbor nodes from the sending node and:

(1) forwarding the received vote token to all neighbor nodes, if the receiving node has the same or less neighbor nodes then the sending node, and

(2) sending a new vote token to all neighbor nodes if the receiving node has more neighbor nodes then the sending node, the new vote token including the address of the receiving node and number of neighbor nodes of the receiving node;

(d) repeating step (c1) and (c2) by each node to which a vote token is either sent or forwarded until one of the nodes receives a token which that node sent and thereby becomes the elected loop-checker node;

(e) sending a loop-check token from the elected loop-checker node to each of the neighbor nodes, said loop check token including an address of the loop-checker node and identification of the port from which the loop-check token was sent;

(f) receiving the loop-check token at each of the neighbor nodes and forwarding the loop-check token to each neighbor node through a port that is different than the port identified in the loop-check token; and

(g) muting any port of the loop-checker node on which the loop-check token is received.

2. The method according to Claim 1, further comprising randomly delaying the loop-check token from being sent.

3. The method according to Claim 1, wherein the random delay is between 1 to 20 seconds.

4. The method according to Claim 2, wherein during the random delay the elected-loop check node continues to forward loop-check token(s) received from other nodes.

5. The method according to Claim 1, wherein once a node is elected as the loop-checker node, the node does not send or forward vote either (a) tokens received from a node having fewer neighbors than the loop-checker node or (b) loop check tokens received from other nodes.

6. A method of loop detection in a communication network including a plurality of nodes, each of the plurality of nodes being directly linked through ports to at least one neighbor node and indirectly linked through a neighbor node to at least one remote node, the method comprising:

(a) detecting a change in topology of the network by at least one of the plurality of nodes;

(b) sending a vote token from the detecting node to each neighbor node, said vote token including an address of the detecting node and number of neighbor nodes of the detecting node;

(c) receiving the vote token from the sending node at each of the neighbor nodes from the sending node and:

(1) forwarding the received vote token to all neighbor nodes, if the receiving node has the same or less neighbor nodes then the sending node, and

(2) sending a new vote token to all neighbor nodes if the receiving node has more neighbor nodes then the sending node, the new vote token including the address of the receiving node and number of neighbor nodes of the receiving node;

(d) repeating step (c1) and (c2) by each node to which a vote token is either sent or forwarded until one of the nodes receives a token which that node sent and thereby the network has detected an occurrence of a loop within the network.

7. A method of loop detection and dissolution in a communication network having a topology which includes a plurality of nodes, each of the plurality of nodes being directly linked through ports to at least one neighbor node and indirectly linked through a neighbor node to at least one remote node, the method comprising the steps of:

- (a) detecting a change in the topology or an external event;
- (b) sending a vote token to all fully qualified neighbors of the node

detecting the change in topology or external event;

- (c) receiving a vote token;
- (d) forwarding the vote token if the receiving node has the same or less

fully qualified neighbors;

- (e) sending a new vote token if the receiving node has more fully qualified neighbors; and

- (f) detecting a loop once a vote token has returned back to originating node.

8. The method according to Claim 7, further comprising sending loop-check tokens to all fully qualified neighbors from the originating node.

9. The method according to Claim 8, wherein the loop-check tokens include the address of the originating node and an address of port which the loop-check token is sent.

10. The method according to Claim 9, further comprising receiving the loop-check token at each of the neighbor nodes and forwarding the loop-check token to each neighbor node through a port that is different than the port identified in the loop-check token.

11. The method according to Claim 10, further comprising muting any port of the loop-checker node on which the loop-check token is received.

12. An apparatus for loop detection and dissolution in a communication network including a plurality of nodes, each of the plurality of nodes being directly linked through ports to at least one neighbor node and indirectly linked through a neighbor node to at least one remote node, the apparatus comprising:

(a) means for detecting a change in topology of the network by at least one of the plurality of nodes;

(b) means for sending a vote token from the detecting node to each neighbor node, said vote token including an address of the detecting node and number of neighbor nodes of the detecting node;

(c) means for receiving the vote token from the sending node at each of the neighbor nodes from the sending node and:

(1) means for forwarding the received vote token to all neighbor nodes, if the receiving node has the same or less neighbor nodes then the sending node, and

(2) means for sending a new vote token to all neighbor nodes if the receiving node has more neighbor nodes then the sending node,

the new vote token including the address of the receiving node and number of neighbor nodes of the receiving node;

(d) means for repeating step (c) by each node to which a vote token is either sent or forwarded until one of the nodes receives a token which that node sent and thereby becomes the elected loop-checker node;

(e) means for sending a loop-check token from the elected loop-checker node to each of the neighbor nodes, said loop check token including an address of the loop-checker node and identification of the port from which the loop-check token was sent;

(f) means for receiving the loop-check token at each of the neighbor nodes and forwarding the loop-check token to each neighbor node through a port that is different than the port identified in the loop-check token; and

(g) means for muting any port of the loop-checker node on which the loop-check token is received.

13. The method according to Claim 12, wherein the loop-check tokens are not able to pass through a muted port.

14. The method according to Claim 12, wherein a node having four or more ports is topologically transformed to two or more nodes having at most three ports.

15. The method according to Claim 12, wherein only one loop-checker node is checking for a loop at the same time.